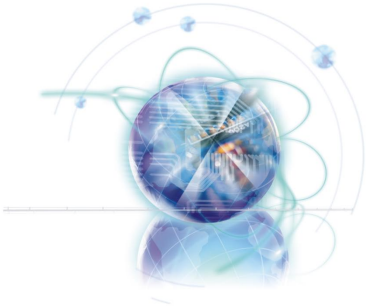


Chapter 1

Getting Started

Thank you for choosing the **7681 v3.2** Series (MS-7681) ATX mainboard. The series mainboards are based on **Intel® P67** chipsets for optimal system efficiency. Designed to fit the advanced **Intel® LGA1155** processor, the series deliver a high performance and professional desktop platform solution.

Mainboard Specifications

Processor Support

- Intel® Sandy Bridge processor in the LGA1155 package

Chipset

- Intel® P67 chipset

Memory Support

- 4 DDR3 DIMMs support DDR3 2133(Over Clocking)/ 1600(Over Clocking)/ 1333/ 1066 DRAM (32GB Max)
- Supports Dual-Channel mode

LAN

- Supports LAN 10/100/1000 by Realtek® RTL8111E

IEEE 1394

- 2 IEEE 1394 ports by VIA® VT6308P (pinheader x1, rear panel x1)

Audio

- Chip integrated by Realtek® ALC892
- Flexible 8-channel audio with jack sensing
- Compliant with Azalia 1.0 Spec

SATA

- 4 SATA 3Gb/s ports (SATA3~6 by Intel® P67 PCH)
- 4 SATA 6Gb/s ports (SATA1~2 by Intel® P67 PCH, SATA7~8 by Marvell® 9128)
- 2 eSATA ports (back panel) by JMicron® JMB362

RAID

- SATA1~6 support Intel® Matrix Storage Technology (AHCI/ RAID 0/ 1/ 5/ 10) by Intel® P67 PCH
- SATA7~8 support RAID 0/ 1 mode by Marvell® SE9128
- 2 eSATA ports support RAID 0/ 1 & JBOD mode by JMicron® JMB362

USB 3.0

- 2 USB 3.0 rear ports by RENESAS uPD720200AF1-DAP-A
- 2 USB 3.0 front ports by RENESAS uPD720200AF1-DAP-A

Connectors/ Ports

- Back panel
  - 1 PS/2 keyboard/mouse port
  - 1 Clear CMOS button
  - 1 Coaxial S/PDIF-Out
  - 1 Optical S/PDIF-Out
  - 1 IEEE 1394 port
  - 8 USB 2.0 ports
  - 2 USB 3.0 ports
  - 2 eSATA ports
  - 1 LAN port
  - 6 flexible audio ports
- On-Board
  - 1 USB 2.0 connector
  - 1 IEEE 1394 connector
  - 1 Front Panel Audio connector
  - 1 OC switch /LED connector
  - 2 USB 3.0 ports

Slots

- 1 PCIE 2.0 x16 slot (PCI_E2)
- 1 PCIE 2.0 x8 slot (in x16 slot)(PCI_E5)
- 3 PCIE 2.0 x1 slots
- 2 PCI slots, support 3.3V/ 5V PCI bus Interface

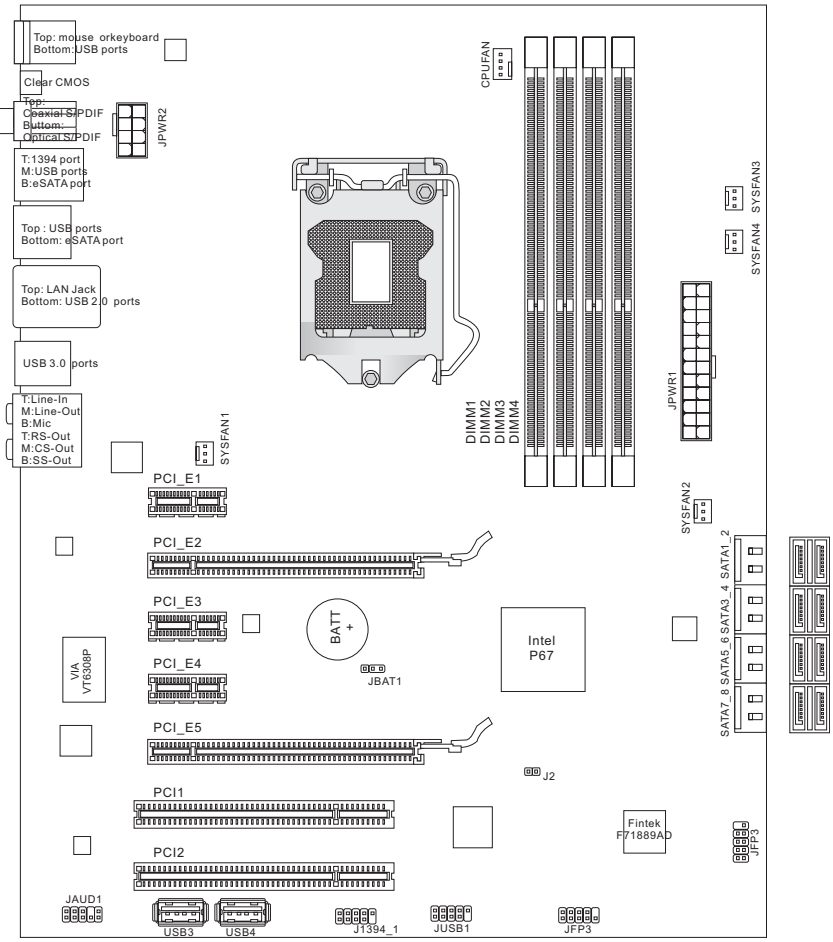
Form Factor

- ATX (30.5cm X 24.5 cm)

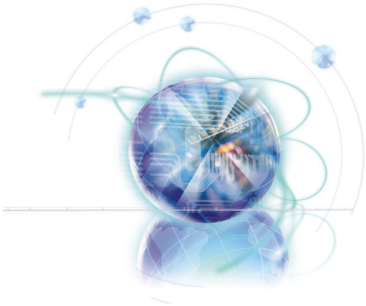
Mounting

- 9 mounting holes

Mainboard Layout



(MS-7681) ATX Mainboard



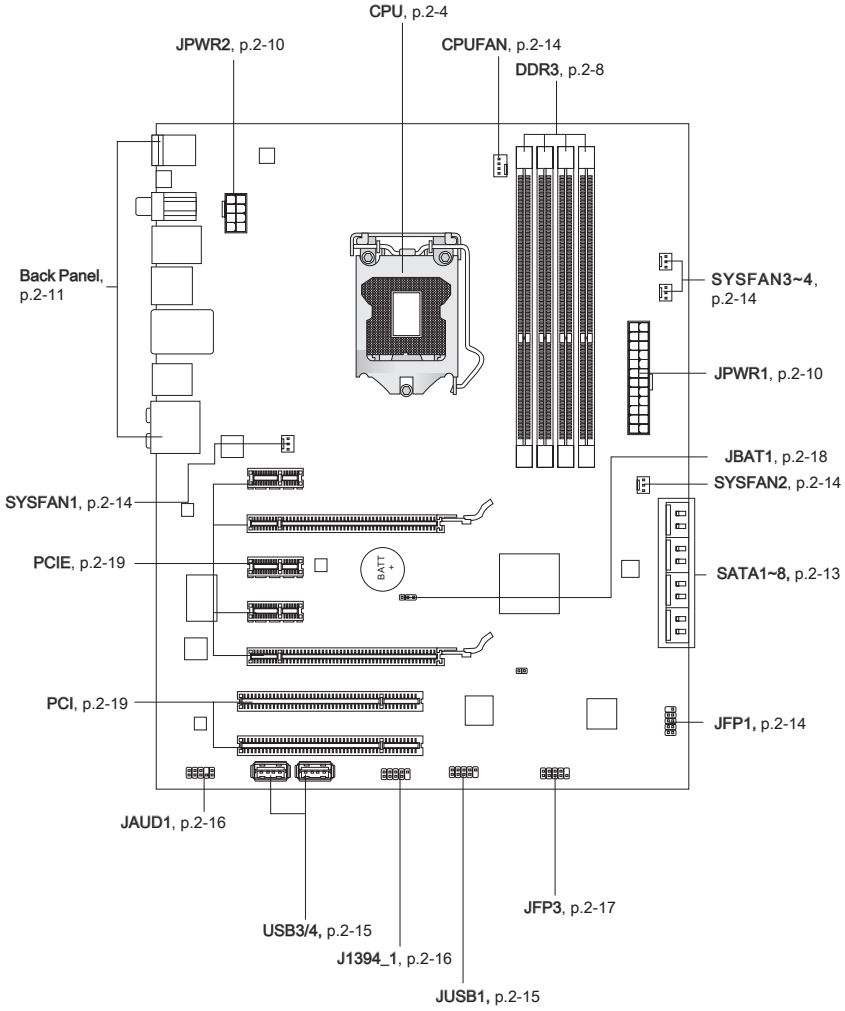
Chapter 2

Hardware Setup

This chapter provides you with the information about hardware setup procedures. While performing the installation, be careful in holding the components and following the installation procedures. For some components, if you install in the wrong orientation, the components will not work properly.

Use a grounded wrist strap before handling computer components. Static electricity may damage the components.

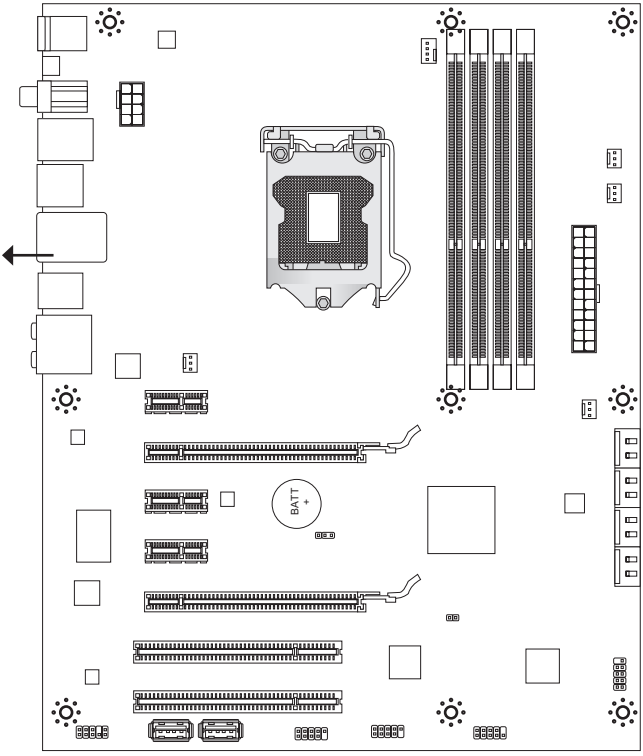
Quick Components Guide



Screw Holes

When you install the mainboard, you have to place the mainboard into the chassis in the correct direction. The locations of screws holes on the mainboard are shown as below.

The side has to toward the rear, the position for the I/O shield of the chassis.



Refer above picture to install standoffs in the appropriate locations on chassis and then screw through the mainboard screw holes into the standoffs.

Important

- *To prevent damage to the mainboard, any contact between the mainboard circuit and chassis or unnecessary standoffs mounted on the chassis is prohibited.*
- *Please make sure there are no metal components placed on the mainboard or within the chassis that may cause short circuit of the mainboard.*

CPU (Central Processing Unit)

When you are installing the CPU, make sure to install the cooler to prevent overheating. If you do not have the CPU cooler, consult your dealer before turning on the computer. For the latest information about CPU, please visit http://www.msi.com/index.php?func=cpuform2

Important

Overheating

Overheating will seriously damage the CPU and system. Always make sure the cooling fan can work properly to protect the CPU from overheating. Make sure that you apply an even layer of thermal paste (or thermal tape) between the CPU and the heatsink to enhance heat dissipation.

Replacing the CPU

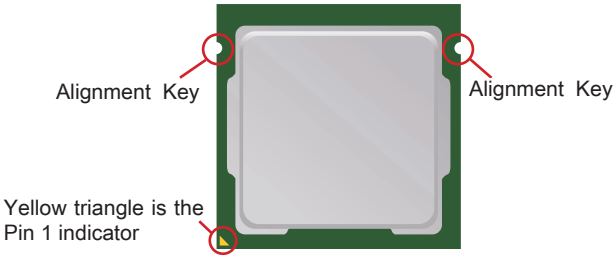
While replacing the CPU, always turn off the ATX power supply or unplug the power supply's power cord from the grounded outlet first to ensure the safety of CPU.

Overclocking

This mainboard is designed to support overclocking. However, please make sure your components are able to tolerate such abnormal setting, while doing overclocking. Any attempt to operate beyond product specifications is not recommended. We do not guarantee the damages or risks caused by inadequate operation or beyond product specifications.

Introduction to LGA 1155 CPU

The surface of LGA 1155 CPU. Remember to apply some thermal paste on it for better heat dispersion.



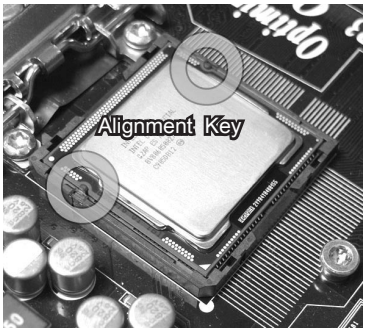
CPU & Cooler Installation

When you are installing the CPU, **make sure the CPU has a cooler attached on the top to prevent overheating**. Meanwhile, do not forget to apply some thermal paste on CPU before installing the heat sink/cooler fan for better heat dispersion.

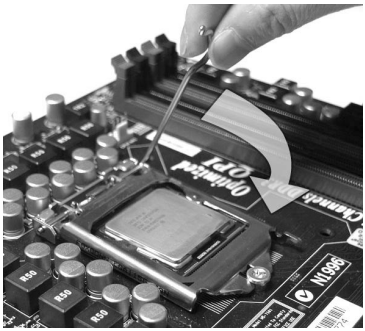
Follow the steps below to install the CPU & cooler correctly. Wrong installation will cause the damage of your CPU & mainboard.

1. The CPU socket has a plastic cap on it to protect the contact from damage. Before you install CPU, always cover it to protect the socket pin. Romove the cap.
2. Open the load level.
3. Lift the load lever up to fully open position.
4. After confirming the CPU direction for correct mating, put down the CPU in the socket housing frame. Be sure to grasp on the edge of the CPU base. Note that the alignment keys are matched.

5. Visually inspect if the CPU is seated well into the socket. If not, take out the CPU with pure vertical motion and reinstall.

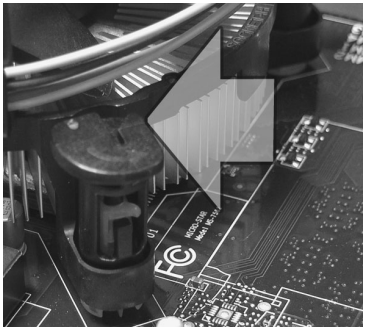


6. Engage the load lever while pressing down lightly onto the load plate.

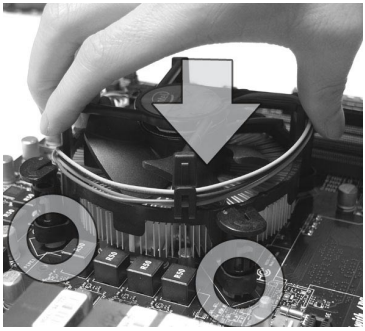


7. Secure the lever near the hook end under the retention tab.

8. Make sure the four hooks are in porper position before you install the cooler.



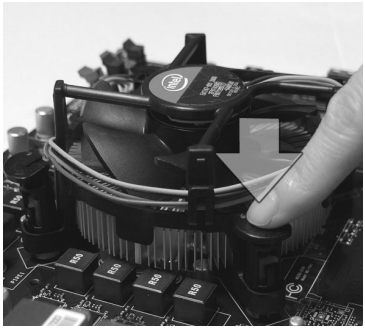
9. Align the holes on the mainboard with the heatsink. Push down the cooler until its four clips get wedged into the holes of the mainboard.



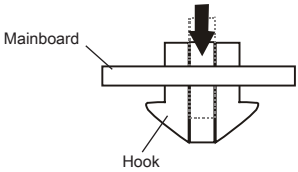
Important

- *Confirm if your CPU cooler is firmly installed before turning on your system.*
- *Do not touch the CPU socket pins to avoid damaging.*

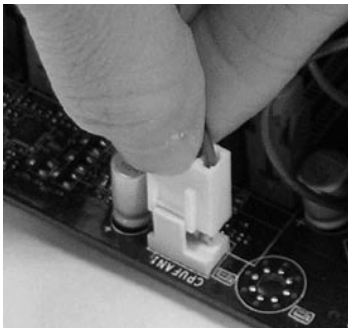
10. Press the four hooks down to fasten the cooler.



11. Turn over the mainboard to confirm that the clip-ends are correctly inserted.



12. Finally, attach the CPU Fan cable to the CPU fan connector on the mainboard.

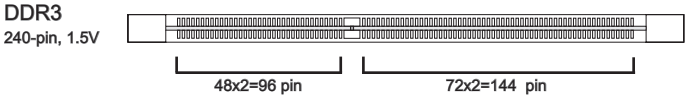


Important

- *Read the CPU status in BIOS.*
- *Whenever CPU is not installed, always protect your CPU socket pin with the plastic cap covered to avoid damaging.*
- *Mainboard photos shown in this section are for demonstration of the CPU/ cooler installation only. The appearance of your mainboard may vary depending on the model you purchase.*
- *Please refer to the documentation in the CPU fan package for more details about the CPU fan installation.*

Memory

These DIMM slots are used for installing memory modules. For more information on compatible components, please visit *http://www.msi.com/index.php?func=testreport*

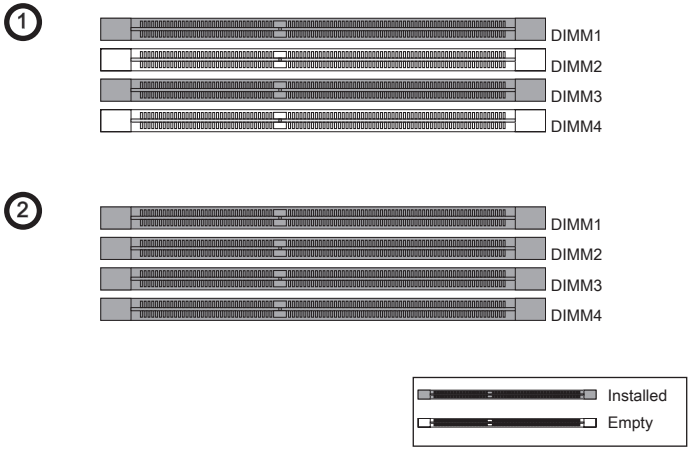


Memory Population Rule

Please refer to the following illustrations for memory population rules.

Dual-Channel mode Population Rule

In Dual-Channel mode, the memory modules can transmit and receive data with two data bus lines simultaneously. Enabling Dual-Channel mode can enhance the system performance. The following illustrations explain the population rules for Dual-Channel mode.

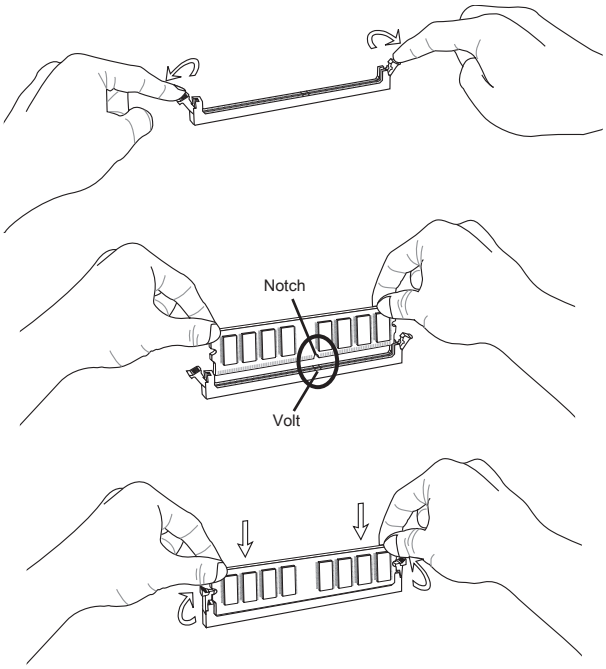


Important

- *DDR3 memory modules are not interchangeable with DDR2, and the DDR3 standard is not backwards compatible. You should always install DDR3 memory modules in the DDR3 DIMM slots.*
- *In Dual-Channel mode, make sure that you install memory modules of the* ***same type and density*** *in different channel DIMM slots.*
- *To ensure a successful system boot-up, always insert the memory modules into the* ***DIMM1 first****.*
- *Due to the chipset resource deployment, the system density will only be detected up to 31+GB (not full 32GB) when each DIMM is installed with a 8GB memory module.*

Installing Memory Modules

1. The memory module has only one notch on the center and will only fit in the right orientation.
2. Insert the memory module vertically into the DIMM slot. Then push it in until the golden finger on the memory module is deeply inserted in the DIMM slot. The plastic clip at each side of the DIMM slot will automatically close when the memory module is properly seated.
3. Manually check if the memory module has been locked in place by the DIMM slot clips at the sides.



Important

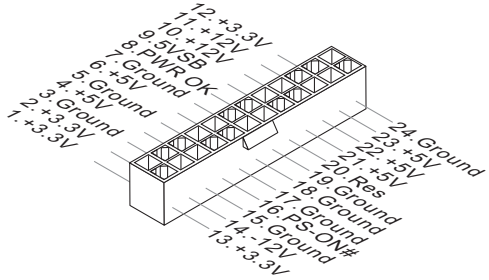
You can barely see the golden finger if the memory module is properly inserted in the DIMM slot.

Power Supply

ATX 24-pin Power Connector: JPWR1

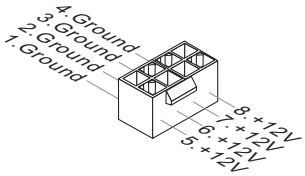
This connector allows you to connect an ATX 24-pin power supply. To connect the ATX 24-pin power supply, make sure the plug of the power supply is inserted in the proper orientation and the pins are aligned. Then push down the power supply firmly into the connector.

You may use the 20-pin ATX power supply as you like. If you'd like to use the 20-pin ATX power supply, please plug your power supply along with pin 1 & pin 13.



ATX 8-pin Power Connector: JPWR2

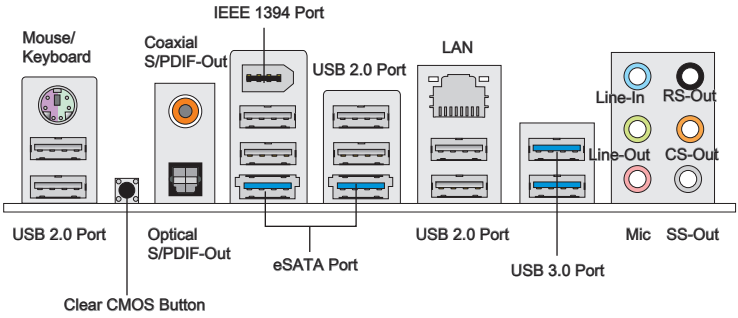
This connector is used to provide the power output to the CPU.



Important

Make sure that all the connectors are connected to proper ATX power supplies to ensure stable operation of the mainboard.

Back Panel



▸ **Mouse/Keyboard**

The standard PS/2® mouse/keyboard DIN connector is for a PS/2® mouse/keyboard.

▸ **Clear CMOS Button**

There is a CMOS RAM on board that has a power supply from external battery to keep the system configuration data. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, use the button to clear data. Press the button to clear the data.

Important

Make sure that you power off the system before clearing CMOS data.

After pressing this button to clear CMOS data in power off (G3) state, the system will boot automatically.

▸ **Coaxial S/PDIF-Out**

This S/PDIF (Sony & Philips Digital Interconnect Format) connector is provided for digital audio transmission to external speakers through a coaxial cable.

▸ **Optical S/PDIF-Out**

This S/PDIF (Sony & Philips Digital Interconnect Format) connector is provided for digital audio transmission to external speakers through an optical fiber cable.

▸ **IEEE 1394 Port**

The IEEE 1394 port on the back panel provides connection to IEEE 1394 devices.

▸ **eSATA Port**

The eSATA (External SATA) port is for attaching the eSATA hard drive.

▸USB 2.0 Port

The USB 2.0 port is for attaching USB devices such as keyboard, mouse, or other USB-compatible devices. Supports data transfer rate up to 480Mbit/s
(Hi-Speed).

▸USB 3.0 Port

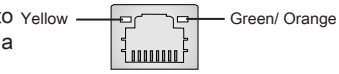
USB 3.0 port is backward-compatible with USB 2.0 devices. It supports data transfer rate up to 5 Gbit/s (SuperSpeed).

Important

If you want to use a USB 3.0 device, you must use the USB 3.0 cable to connect to the USB 3.0 port.

▸LAN

The standard RJ-45 LAN jack is for connection to the Local Area Network (LAN). You can connect a network cable to it.



LED	Color	LED State	Condition
Left	Yellow	Off	LAN link is not established.
		On(Steady state)	LAN link is established.
		On(brighter & pulsing)	The computer is communicating with another computer on the LAN.
Right	Green	Off	10 Mbit/sec data rate is selected.
		On	100 Mbit/sec data rate is selected.
	Orange	On	1000 Mbit/sec data rate is selected.

▸Audio Ports

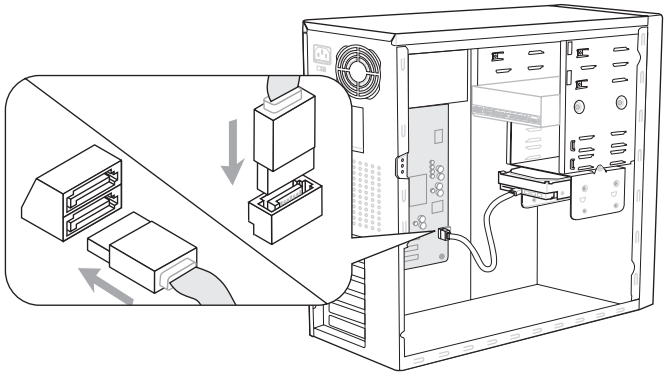
These audio connectors are used for audio devices. It is easy to differentiate between audio effects according to the color of audio jacks.

- Line-In: Blue - Line In, is used for external CD player, tape-player or other audio devices.
- Line-Out: Green - Line Out, is a connector for speakers or headphones.
- Mic: Pink - Mic, is a connector for microphones.
- RS-Out: Black - Rear-Surround Out in 4/ 5.1/ 7.1 channel mode.
- CS-Out: Orange - Center/ Subwoofer Out in 5.1/ 7.1 channel mode.
- SS-Out: Gray - Side-Surround Out 7.1 channel mode.

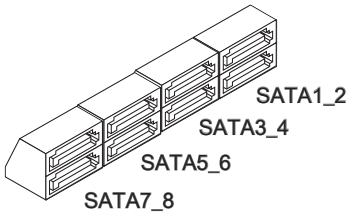
Connectors

Serial ATA Connector: SATA1~8

This connector is a high-speed Serial ATA interface port. Each connector can connect to one Serial ATA device.



* The MB layout in this figure is for reference only.



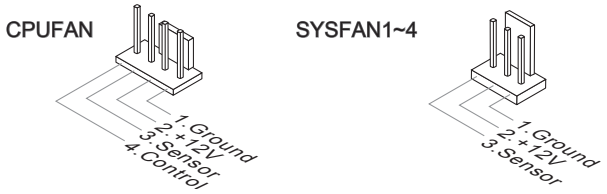
SATA1~2 & SATA7~8 (6Gb/s)
SATA3~6 (3Gb/s)

Important

Please do not fold the Serial ATA cable into a 90-degree angle. Otherwise, data loss may occur during transmission.

Fan Power Connectors: CPUFAN,SYSFAN1~4

The fan power connectors support system cooling fan with +12V. When connecting the wire to the connectors, always note that the red wire is the positive and should be connected to the +12V; the black wire is Ground and should be connected to GND. If the mainboard has a System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.

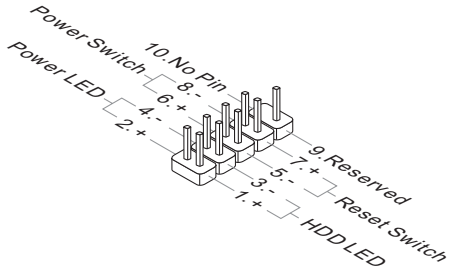


Important

- *Please refer to the recommended CPU fans at processor's official website or consult the vendors for proper CPU cooling fan.*
- *Fan cooler set with 3 or 4 pins power connector are both available for CPUFAN.*

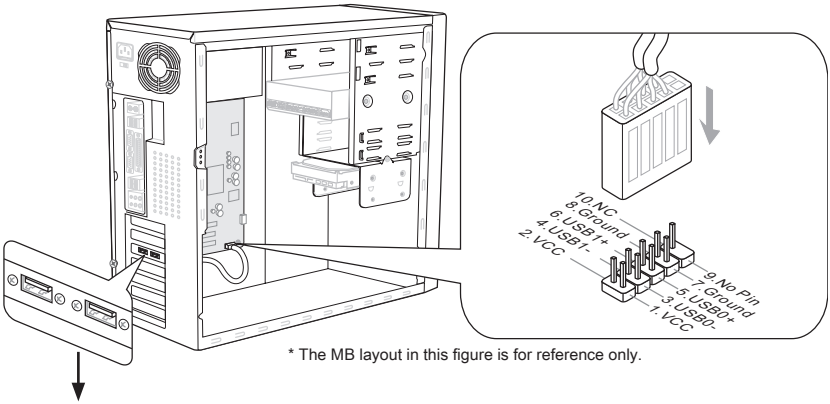
Front Panel Connector: JFP1

These connectors are for electrical connection to the front panel switches and LEDs. The JFP1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.



Front USB 2.0 Connector: JUSB1

This connector, compliant with Intel® I/O Connectivity Design Guide, is ideal for connecting high-speed USB interface peripherals such as USB HDD, digital cameras, MP3 players, printers, modems and the like.



* The MB layout in this figure is for reference only.

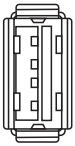
USB Bracket (optional)

Important

- *Note that the pins of VCC and GND must be connected correctly to avoid possible damage.*

Front USB 3.0 Port: USB3/ USB4

USB 3.0 port is backward-compatible with USB 2.0 devices. Supports data transfer rate up to 5 Gbit/s (SuperSpeed). It is for medion front connect module.



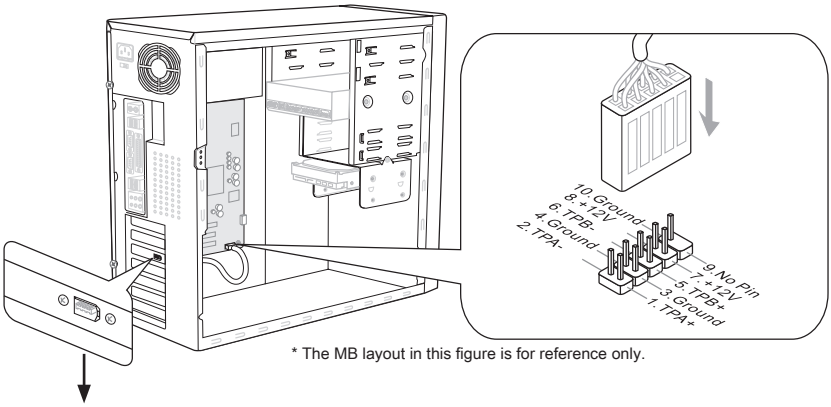
USB 3.0 connector: USB3/ 4

Important

- *If you want to use a USB 3.0 device, you must use the USB 3.0 cable to connect to the USB 3.0 port.*

IEEE1394 Connector: J1394_1

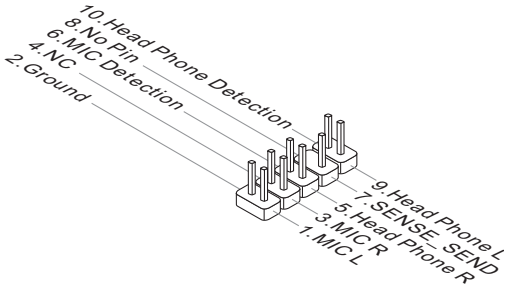
This connector allows you to connect the IEEE1394 device via an optional IEEE1394 bracket.



* The MB layout in this figure is for reference only.

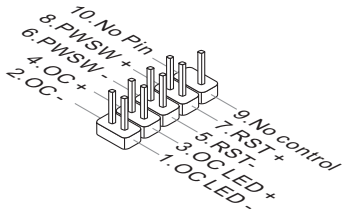
Front Panel Audio Connector: JAUD1

This connector allows you to connect the front panel audio and is compliant with Intel® Front Panel I/O Connectivity Design Guide.



OC switch /LED Connector: JFP3

This connector is for electrical connection to the overclocking switch and LED.



Jumpers

Clear CMOS Jumper: JBAT1

There is a CMOS RAM on board with an external battery power supply to preserve the system configuration data. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, set the jumper to clear data.

JBAT1 Keep Data Clear Data

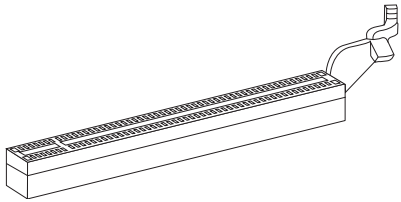
Important

You can clear CMOS by shorting 2-3 pin while the system is off. Then return to 1-2 pin position. Avoid clearing the CMOS while the system is on; it will damage the mainboard.

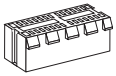
Slots

PCIE (Peripheral Component Interconnect Express) Slot

The PCIE slot supports the PCIE interface expansion card.



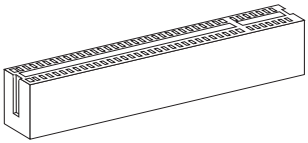
PCIE x16 Slot



PCIE x1 Slot

PCI (Peripheral Component Interconnect) Slot

The PCI slot supports LAN card, SCSI card, USB card, and other add-on cards that comply with PCI specifications.



32-bit PCI Slot

Important

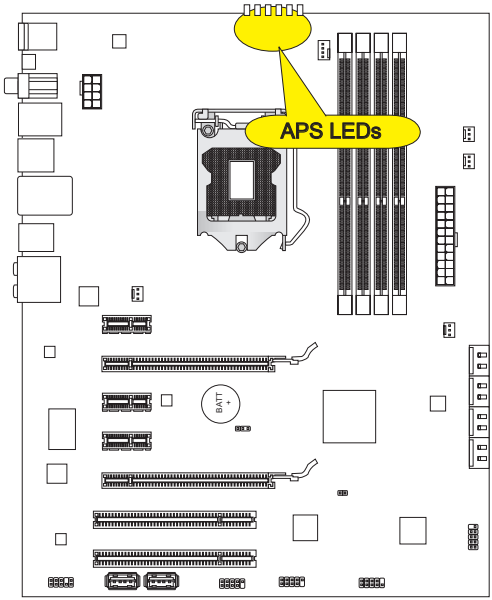
When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

PCI Interrupt Request Routing

The IRQ, acronym of interrupt request line and pronounced I-R-Q, are hardware lines over which devices can send interrupt signals to the microprocessor. The PCI IRQ pins are typically connected to the PCI bus pins as follows:

	Order1	Order2	Order3	Order4
PCI Slot1	INT A#	INT B#	INT C#	INT D#
PCI Slot2	INT B#	INT C#	INT D#	INT A#

LED Status Indicators



APS LED

The APS (Active Phase Switching) LED indicate the current CPU power phase mode. Follow the instructions below to read.

▮ : Lights ▯ : Off

▮▯▯▯▯▯ CPU is in 1 phase power mode.
▮▮▯▯▯▯ CPU is in 2 phase power mode.
▮▮▮▯▯▯ CPU is in 3 phase power mode.
▮▮▮▮▯▯ CPU is in 4 phase power mode.
▮▮▮▮▮▯ CPU is in 5 phase power mode.
▮▮▮▮▮▮ CPU is in 6 phase power mode.